

each other. Each member 131 comprises two stems 133 and 135 having ends 133A and 135A which are joined to the periphery of the lens body 121, for example, by being inserted into apertures formed into the periphery of the lens body and secured therein by suitable heat treatment. The other ends of the stems 133 are formed into coils or curls 137 and 139 having ends which cross each other respectively. The coils 137 and 139 then extend to arm portions 141 and 143 which cross each other and then extend to a peripheral or seating portion 145 adapted to seat against or engage the tissue of the eye. The coils 137 and 139 provide the desired flexibility and yet allow for geometrically stable haptic flexion on the application of compression forces to the peripheral portions 145 towards the lens body. When compression forces are applied to the peripheral portions 145 of the members 131 towards the lens body, the coils 137 and 139 tend to wind or close rather than unwind or open as occurred in the operation of the haptics of the lenses described previously. The closure or winding of the coils 137 and 139 not only has the advantage of preventing of minimizing anterior optic movement but tends to draw the optic back away from the cornea.

In the lens of FIG. 18, the coils 117 and 119 are located on the outside of the stems 113 and 115. In the lens of FIG. 19, the coils 137 and 139 are located on the inside of the stems 133 and 135.

Referring to FIG. 20, the intraocular lens comprises an optic or lens body 21 having two closed loop haptics or fixation position members 151 which are identical to each other. Each member 151 comprises two stems 153 and 155 having ends 153A and 155A which are joined to the periphery of the lens body 21 periphery, for example, by being inserted into apertures formed into the periphery of the lens body and secured therein by suitable heat treatment. The other ends of the stems 153 and 155 are formed into coils or curls 157 and 159 having ends which cross each other respectively. The coils then extend to arm portions 161 and 163 which extend from the coils inwardly and outwardly and then extend to a peripheral seating portion 165 adapted to seat against or engage the tissue of the eye. The coils 157 and 159 provide the desired flexibility and yet result in geometrically stable haptic flexion upon the application of the compression forces to the peripheral portions 165 of the members 151 towards the lens body. When compressive force is applied to the peripheral portions 165 of the members 151 towards the lens body, the coils 157 and 159 tend to wind or close. Closure or winding of the coils 157 and 159 not only have the advantage of preventing or minimizing anterior optic movement but also tend to draw the optic backward from the cornea assuming that the optic is located in the anterior chamber of the eye.

Referring to FIG. 21, the intraocular lens shown is the same as that illustrated in FIG. 8 except that connecting portions 171 are connected between the coils 31 and 33 at portions closest to the peripheral portion 45. The connecting portions 171 do not interfere with the opening or unwinding of the coils upon the application of pressure to the peripheral portions 45 towards the lens body but do prevent the stems 25 and 27 from moving away or moving toward each other upon the application of this pressure. Similar connecting portions may be connected in the same manner to the coils of the lenses of FIGS. 1, 10, 11, 12 and 17.

The optic of all of the lenses of FIGS. 1 and 8-21 may be of the convex planar shape as shown in FIGS. 2 and

3, of the biconvex shape as shown in FIGS. 4 and 5 or of other suitable configurations. In addition, the haptics of the intraocular lens of FIGS. 1 and 8-21 whether in the form of a closed loop haptic or an open loop haptic or a combination thereof may be straight as shown in FIGS. 2 and 4 or angulated or vaulted as shown in FIGS. 3 and 5. Vaulting is desirable for lenses that are to be located in the anterior chamber of the eye to locate the lens body or optic anterior or forward of the iris as disclosed in U.S. Pat. No. 4,418,431. Vaulting also is desirable for lenses in the posterior chamber. It keeps the lens away from the iris and also nearer to the theoretically desirable nodal point. For the lenses that have angulated or vaulted haptics, the coil portions of the coils leading to the peripheral seating portions of the haptics will curl or coil behind the coil portion that extends to the stems, for example, as shown in FIGS. 2 and 5. In this application, the term behind, means that the coil portion which extends to the peripheral seating portion of the haptic will be closer to the plane of the peripheral portion of the haptic than the portion of the coil that extends to the stem. The purpose of this arrangement is to prevent the coil from bumping into the stem during flexion which may occur, for example, if the coil portion which extends to the peripheral seating portion of the haptic is forward of the portion of the coil connected to the stem in a vaulted or angulated haptic.

Although the intraocular lenses shown either have two closed loop haptics or two open loop haptics, it is to be understood that one of the open loop haptics of the invention could be employed in a lens with one of the closed loop haptics of the invention depending upon the design desired. In addition, one of the open loop haptics of the invention could be employed in a lens with a different type of haptic or one of the closed loop haptics of the invention could be employed in a lens with a different type of haptic.

I claim:

1. An intraocular lens suitable for use as an artificial lens implant in the human eye, comprising:
  - a lens body having first and second position fixation members extending from opposite sides of the periphery of said lens body,
  - each of said position fixation members comprising a stem portion having first and second ends, a coil portion having first and second ends, and a peripheral portion extending to a position such that it may engage the tissue of the eye,
  - each of said coil portions being located between said lens body and the peripheral portion of its position fixation member,
  - said first end of each of said stem portions being joined to said lens body,
  - said second end of each of said stem portions being joined to said first end of its associated coil portion,
  - said first and second ends of each of said coil portions cross each other as seen in a plane generally perpendicular to the axis to said lens body,
  - each of said second ends of each of said coil portions being coupled to the peripheral portion of its position fixation member by way of a transverse portion which is generally transverse to a second plane coinciding with and passing through the axis of said lens body and through said peripheral portions of said first and second position fixation members such that when pressure is applied to said peripheral portions of said position fixation members towards said lens body, pressure is applied to said